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Subject: Response to Office Action Summary Dated April 01, 2005 for Application No. 09/753, 370

1. Claims 1-72 of patent application submitted on Jan 2, 2001 are cancelled. On Dec 16, 2004, 21 new claims were submitted and are now renumbered 73-93. These are presented in Appendix A.

2. An article published in the Journal of Sound and Vibration entitled "Methods to increase sound fidelity and quality produced from piezoelectric devices" by S. E. Woodard is enclosed. The article discusses the multi-functional device described in the specifications. Results of using acoustic chambers are shown in Fig 5 of the article. Figs 6 and 7 show the results of using damping material (such as synthetic polyolefin) on vibration response and audio response. Figs 11 and 12 compare audio response of complete piezo-audio device to that of traditionally used Mylar cones.

In regards to rejection of claims 81-83 and 86-87, the claims are amended to be independent of claim 73. As discussed in application date Jan 2, 2001, the acoustic member's function is to be operatively coupled to any transducer that produces mechanical vibrations. The structure of the acoustic chamber is that of a Helmholtz chamber less one surface. The transducer is coupled to acoustic chamber to be the surface necessary to form a Helmholtz chamber. The audio function of the acoustic chamber cannot be produced using only a proof mass. The mechanical excitation necessary to produce an acoustic output from the chamber is the provided by the transducer. This is discussed on p19 of application. A flat piezoelectric device is a specific example of a transducer that can be operatively couple to the chamber. The acoustic chamber functions for any vibrating surface irrespective of vibration source.

81. [Currently amended] An acoustic member for amplifying sound, comprising a surrounding wall portion connected to two end portions, said one end portion having an orifice to form a passageway through the end portion, and said other end portion is that of a mechanically excited vibrating surface to form an enclosed chamber within the acoustic member when the bottom surface of the acoustic member is connected to the piezoelectric component.

82. [Currently amended] The device of claim 9 where the mechanically excited vibrating surface is a piezoelectric device.

83. [Currently amended] The device of claim 9 where the acoustic member is operatively connected to the surface of any transducer capable of producing mechanical vibrations

87. (15.) [Currently amended] The device according to claim 82, wherein the point of attachment of at least one acoustic member is approximately at an anti-node of the piezoelectric component.

In regards to rejection of claim 5, the device of Saarmaa et al, No. 6,198,206 shown in their Fig 4 is that of a rectangular active piezoelectric material attached to electrical leads. A common covering is used for the rectangular active piezoelectric device and the electrical flex circuits used for electrical leads. The planform of the leads require a smaller width than that of the rectangular area thus the planform (geometric outline) is that of a "T" shape. In Woodard et al, the geometric outline of the active piezoelectric material is that of a "T." When both devices are mounted in a cantilever manner. The device taught in Woodard et al (09/753, 370) operates differently when clamped at its throat. The vibration response for the device taught in Woodard et al is shown in Fig 15 (Woodard). The response shown in Fig 15 is unique. Fig 15 shows the vibration deformation at various frequencies when the neck-region is clamped. Saarmaa is that of a clamped rectangular plate, Fig 3A, whose vibration response is known in the art. Note that in Fig 3A (Saarmaa), the leads are not clamped. One can also examine Fig 1A of Saarmaa. Fig 1A shows two active piezoelectric portions. In a manner similar to Fig 4, a common material covers the active piezoelectric portions and the portions having the electrical leads to the active portions. Note, shape of plan for covering as compared to that for active material.

Claim 73 is amended to specifically claim the device with T-shaped planform (geometric outline). Claim 89 is cancelled. Claim 78 is also amended.

73. [Currently amended] A device for producing mechanical vibrations in response to an electrical signal, comprising

a piezoelectric component having two opposing surfaces, said piezoelectric component further having at least two points where polarity is recognized; and wherein the piezoelectric component has a T-shaped planform.

78. [Currently amended] The device according to claim 73 further comprising a clamp, connected at the neck region of the piezoelectric component, for coupling the piezoelectric component to a base in a cantilever fashion.

In regards to rejection of claim 80, the device 320 is to adjustably connect the block, 320, to a base, wall or housing. The device of Woodard et al, Claim 80, specifies adjustably clamps the neck region to alter the vibration response. This allows the amount of exposed next region to adjustably and thereby altering its vibration response.

80. [Currently amended] The device according to claim 1 further comprising means, positioned at one end of the piezoelectric component, for adjustably clamping the piezoelectric neck region.

In regards to the rejection of Claim 88, this claim is modified to specify materials of low elastic modulus. The claim is also rewritten to be independent.

88. [Currently amended] A device for producing mechanical vibrations in response to an electrical signal, comprising

a piezoelectric component having two opposing surfaces, said piezoelectric component further having at least two points where polarity is recognized; and wherein a dampening material substantially covers at least one surface of the piezoelectric component, said damping material has low elastic modulus similar to those of group of material consisting of polyolefin, synthetic polyolefin, 3M Scotch (TM) 468 MP High Performance Adhesive or 3M Scotch (TM) 859 Removable Mounting Squares.

Summary of claims modification

73. [Currently amended] A device for producing mechanical vibrations in response to an electrical signal, comprising

a piezoelectric component having two opposing surfaces, said piezoelectric component further having at least two points where polarity is recognized; and wherein the piezoelectric component has a T-shaped planform.

74. [Currently amended] The device according to claim 73, wherein the piezoelectric component comprises a unimorph piezoelectric structure having piezoelectric material bonded between two metallic support layers.

75. [Currently amended] The device according to claim 73, wherein the piezoelectric component comprises a bimorph piezoelectric structure having piezoelectric material bonded to two different

76. [Currently amended] The device according to claim 73 wherein at least one acoustic member is attached to one of the surfaces of the piezoelectric component.

77. (Cancelled)

78. [Currently amended] The device according to claim 73 further comprising a clamp, connected at the neck region of the piezoelectric component, for coupling the piezoelectric component to a base in a cantilever fashion.

79. The device according to claim 73 further comprising a clamp, connected at one end of the piezoelectric component, for coupling the piezoelectric component to a base.

80. [Currently amended] The device according to claim 73 further comprising means, positioned at one end of the piezoelectric component, for adjustably connecting the piezoelectric component to a base surface.

81. [Currently amended] An acoustic member for amplifying sound, comprising

a surrounding wall portion connected to two end portions, said one end portion having an orifice to form a passageway through the end portion, and said other end portion is that of a mechanically excited vibrating surface to form an enclosed chamber within the acoustic member when the bottom surface of the acoustic member is connected to the piezoelectric component.

82. [Currently amended] The device of claim 81 where the mechanically excited vibrating surface is a piezoelectric device.

83. [Currently amended] The device of claim 81 where the acoustic member is operatively connected to the surface of any transducer capable of producing mechanical vibrations

84. [Currently amended] The device according to claim 73 wherein the mechanical vibrations are of sufficient force to produce audible sound over substantially the entire audible frequency range.

85. [Currently amended] The device according to claim 73 wherein the mechanical vibrations are of sufficient force as to be readily felt by a holder of the device.

87. [Currently amended] The device according to claim 82, wherein the point of

attachment of at least one acoustic member is approximately at an anti-node of the piezoelectric component.

88. [Currently amended] A device for producing mechanical vibrations in response to an electrical signal, comprising

a piezoelectric component having two opposing surfaces, said piezoelectric component further having at least two points where polarity is recognized; and wherein a dampening material substantially covers at least one surface of the piezoelectric device, said damping material has low elastic modulus similar to those of group of material consisting of polyolefin, synthetic polyolefin, 3M Scotch (TM) 468 MP High Performance Adhesive or 3M Scotch (TM) 859 Removable Mounting Squares.

89- 93. [Cancelled]

94. [New] The device according to claim 73 wherein a dampening material substantially covers at least one surface of the piezoelectric device, said damping material has low elastic modulus similar to those of group of material consisting of polyolefin, synthetic polyolefin, 3M Scotch (TM) 468 MP High Performance Adhesive or 3M Scotch (TM) 859 Removable Mounting Squares

95. [New] The device of claim 94 where one or more acoustic members are operatively connected to the surface of the piezoelectric device

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